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Proceedings of the national peer review on Providing science advice to management in the interim years for multi-year stock assessments (Technical Expertise on Stock Assessments)

March 10-12, 2015
Ottawa, Ontario

Chairperson: Joanne Morgan and Brian Lester
Editor: Nicholas Duprey

Fisheries and Oceans Canada
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200 Kent Street, Ottawa, Ontario K1A 0E6

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Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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SUMMARY

These Proceedings summarize the relevant discussions and key conclusions that resulted from a Fisheries and Oceans Canada (DFO) Canadian Science Advisory Secretariat (CSAS) National Peer Review meeting on March 10-12, 2015 in Ottawa, Ontario. A working paper titled "providing science advice to management in the interim years for multi-year stock assessment" was presented for discussion and peer review.

In-person participation included DFO Science and Ecosystems and Fisheries Management (EFM) staff from each of the Department's regional offices.

During the three day meeting the draft research document was thoroughly reviewed and improved by the participants, and a draft of the Science Advisory Report (SAR) was reviewed and revised. The conclusions and advice resulting from this review process will be provided in the form of the Research Document and the SAR, imparting advice to DFO Science and EFM on providing advice and guidance to management in the interim years for multi-year stock assessments.

The Research Document and supporting Science Advisory Report will be made publicly available on the CSAS Science Advisory Schedule.

SOMMAIRE

Le présent compte rendu résume les principales discussions et conclusions découlant de la réunion d'examen national par les pairs du Secrétariat canadien de consultation scientifique (SCCS) de Pêches et Océans Canada (MPO) qui s'est tenue du 10 au 12 mars 2015, à Ottawa (Ontario). Un document de travail intitulé « Fournir des avis scientifiques à la direction pendant les années intermédiaires pour les évaluations pluriannuelles des stocks » a été présenté aux fins de discussion et d'examen par les pairs.

Des membres du personnel de Gestion des écosystèmes et des pêches (GEP) et du Secteur des Sciences de chaque bureau régional du ministère sont présents.

Pendant les trois jours de la réunion, la version provisoire du document a été examinée en profondeur et les participants l'ont améliorée. Une version provisoire de l'avis scientifique a été étudiée et révisée. Les conclusions et avis découlant de cet examen seront présentés dans l'avis scientifique et le document de recherche afin de conseiller le Secteur des Sciences et la GEP en matière de prestation d'avis scientifiques à la direction pendant les années intermédiaires pour les évaluations pluriannuelles des stocks.

Le document de recherche et l'avis scientifique à l'appui seront rendus publics dans le calendrier des avis scientifiques du SCCS.

INTRODUCTION

A Fisheries and Oceans Canada (DFO) Canadian Science Advisory Secretariat (CSAS) National Peer Review (NPR) meeting was held March 10-12, 2015 in Ottawa, Ontario. This process was also a Technical Expertise in Stock Assessment (TESA) workshop, initiated and developed by TESA to address a gap in guidance for multi-year stock assessments. This National Peer Review Process reviewed a draft Research Document titled "providing science advice to management in the interim years for multi-year stock assessments".

The Terms of Reference (TOR) for the science advice (Appendix C) were developed by a steering committee made up of the TESA steering committee, representatives from the regional CSAS coordinators, and the chairs of the meeting. Notifications of the science review and conditions for participation were sent to various representatives with relevant expertise in the subject area within DFO Science and DFO Ecosystems and Fisheries Management (EFM). As part of the lead up to the March 10-12 face-to-face meeting there were two WebEx meetings. These meetings were held in order to review regional information, develop a workplan for preparing the Research Document and finalize the TOR, invitee list, and Agenda for the face-to-face meeting.

WEBEX MEETINGS

In order to foster an early discussion and exchange of ideas and to produce some of the information needed for consideration in providing science advice to management in the interim years, two WebEx meetings occurred prior to the face to face meeting. During the first meeting, on January 29 2015, regional TESA representatives presented information from their respective region on stocks assessed on a multi-year schedule. A questionnaire had been developed and distributed to the regional representatives indicating the information that should be collected for each multi-year assessed stock. The goals of the questionnaire were to identify how many stocks are currently assessed by science on a multi-year schedule, how they were assessed, how they were managed and if they had any indicators or triggers defined for interim years. Following the presentations from each region a slightly modified version (version 2) of the questionnaire was developed and re-circulated to the TESA representatives; version 2 of the questionnaire would address some information gaps and the structure would make for an easier roll-up of the information. It was agreed that a national roll-up of the questionnaire responses would be presented in the working paper.

During the second WebEx meeting, on February 19 2015, short presentations on how interim advice is being delivered in other jurisdictions were made and the draft outline of the working paper was reviewed. The short presentations on other jurisdictions included information from the International Council for the Exploration of the Sea (ICES), International Commission for the Conservation of Atlantic Tunas (ICCAT), Northwest Atlantic Fisheries Organization (NAFO), United States of America, Australia and New Zealand. The presentations were based on a review of public documents and personal communications with assessment scientists within the jurisdictions. These short presentations were used to draft the section of the Research Document on "overview of the current multi-year assessments and the type of advice being provided: where are we now – other jurisdictions". The draft outline of the working paper was also reviewed during the WebEx meeting. Individuals were identified to lead the drafting of sections and to coordinate content.

THE FACE-TO-FACE MEETING IN OTTAWA

The following working paper was prepared and made available to meeting participants prior to the meeting:

> Krohn, M., Chaput, G., Duplisea, D., Duprey, N., Healey, B., Edwards, A., and Tallman, R. 2015. Providing science advice to management in the interim years for multi-year stock assessments. DFO Can. Sci. Advis. Sec. Res. Doc. Working paper: viii + 41 p. (CSAS WP2015-XX)

The meeting Co-Chairs, Joanne Morgan and Brian Lester, welcomed participants and gave a general overview of the CSAS process. The Chairs discussed the publications from the National Peer Review (NPR) meeting [Science Advisory Report (SAR), Proceedings, and Research Document]. Everyone was invited to participate fully in the discussion and to contribute knowledge to the process, with the goal of delivering scientifically defensible conclusions and advice. It was confirmed with participants that all had received copies of the TOR, and the draft working paper.

The Chairs reviewed the Meeting Agenda (Appendix A) and the TOR (Appendix C) for the meeting, highlighting the objectives. The Chairs then provided an outline of how the science review process would occur over the three days. In total, 20 people participated in this face-to-face NPR (Appendix B).

Participants were reminded that no formal reviews had been written on the presented paper. Therefore participants were expected to provide extensive input throughout the three days to improve the paper's language, content, understanding and relevance, especially from the perspective of their DFO region.

REVIEW OF WORKING PAPER

Presentation of working paper

The lead from each section of the paper took turns presenting material from the working paper, during the presentations input, questions and revisions occurred.

Working paper table of contents

1. Introduction
2. Overview of current multi-year assessments and the type of advice being provided: where we are now
3. Guidance on providing advice for interim years between assessments
    - 3.1 Examples for providing interim year advice and assessment triggers for specific assessment types and management regimes
    - 3.2 Considerations for defining indicators to be used in interim years
    - 3.3 Roles and responsible for triggering an early assessment
    - 3.4 Guidance for setting triggers that would prompt an assessment earlier than the pre-agreed assessment cycle
    - 3.5 Adjusting harvest advice and/or fish plan according to the change in status indicators (with defined harvest control rules)
    - 3.6 Considerations for determining the frequency of interim year updates

4. Communication of advice including interim year updates
5. ToR development checklist (for assessments and for interim year stock updates)

Committee discussions by section

Section 1 – Introduction

General discussion took place around the wording in the introduction, the attendees concurred on some minor wording changes to clarify the text. Committee discussions on the section "Definition of Terms" was extensive, making sure that each term was clearly defined and also highlighting other terms that would need to be included in the section. It was agreed that the term "Distinction between advice and assessment" be broken into defining "Advice" and "Assessment". Also it was agreed the terms "Indicator" and "Trigger" should be added to this section. The committee formulated and agreed to the following definitions of these two new terms:

1. Indicator: proxies or metrics of stock status, and,
2. Trigger: pre-defined thresholds of an indicator which if crossed would signal a change in stock status that may warrant an assessment ahead of schedule.

The committee also highlighted the importance of keeping the language consistent throughout the document to avoid confusion (such as using the term "full stock assessment" when referring to a normally scheduled stock assessment, as opposed to simply an assessment).

Section 2 – Overview of current multi-year assessments and the type of advice being provided: where are we now

In this section the overview of current multi-year assessments was summarized using version 2 of the questionnaire that was circulated to TESA regional representatives for input on stocks within their regions. The responses were rolled-up to provide a national overview of how many stock assessments were providing multi-year advice, the interval between this advice and information on stocks that had already defined indicators and triggers for interim years.

The authors re-iterated that information from one region was still outstanding and that the presented numbers would change when the region submitted their questionnaire responses. It was also mentioned that not all stocks were included in regional responses, some regions included all stocks when responding, others only included the stocks assessed using a multi-year approach. The committee discussed sending the questionnaire back to the regions to get responses on all the stocks, but in the end it was decided this would result in much work and this wasn't needed for the purposes of the paper, nor the resulting advice. Therefore, it was decided Figure 1 (reporting a national roll-up of the number of stocks using different multi-year intervals) should not include the data on stocks which are assessed annually, as only some of the regions reported on these stocks. Also, the figures and presented statistics throughout the section will be updated so that annual fisheries are not included in any of the summaries and these will be reviewed for accuracy.

Several small editorial changes for section 2.3 (Identified gaps in current practices for providing advice for interim years) were recommended and accepted. The committee suggested two additional topics that should be added to this section. The first was to highlight that there is little consistency in how interim advice is provided across Canada and there needs to be more clear and concise direction on how interim advice should be addressed for stocks assessed on a multi-year rotation. Also, at the moment there are no explicit roles and responsibilities for Science and EFM. The roles of Science and EFM need to be clearly articulated throughout the process of interim advice. Wording for each of these new points will be added to this section.

Section 3.1 – Examples for providing interim year advice and assessment triggers for specific assessment types and management regimes

The committee thoroughly reviewed the examples presented on providing interim year updates and assessment triggers for specific assessment types and management regimes.

Input Control Fisheries

American Lobster lobster fishing area (LFA) 41, which has established triggers, was originally an example in this section, but the committee removed it after discussion highlighted that it wasn't in fact a good example because LFA 41 is the only LFA which is not an input controlled fishery.

Fishery Independent Survey Index Based Assessment

Atlantic Salmon and 3Ps cod were removed from this section as they are assessed annually and are not good examples. The Dolly Varden was proposed as a new example for this section, Kimberly Howland agreed to draft this example for the paper. Also Inconnu will be added to this section (see below).

Catch Trend Based Assessment

The committee noted that the Inconnu example was mistakenly put in this section and should be moved to the Fishery Independent Survey Index Based Assessment section.

Environmental or Other Index Based Assessments

A lengthy discussion on this section highlighted some potentially interesting examples. One candidate example looking at warm year – cold year plankton production will be researched more by Andrew Newbould to see if it would be a good example for this section. Another candidate example using Harp Seals and the influence of ice cover will be discussed further with Mike Hammill to establish if this would also be a good example for the paper.

Analytical model based assessment without feedback simulation

In this section several examples had already been nicely described. A list of other potential examples was reviewed (Grey Seal, Harp Seal, Nunavik Belugas, Swordfish, and Sea Scallop) and all of these examples were deemed not appropriate for the section. Albacore Tuna was proposed as a good example for this section and Andrew Edwards has written a small explanation of this example which he will provide for the paper. The example of Atlantic salmon used by ICES was included in this section.

Analytical model based assessment with feedback simulation

The Western Scotian Shelf Pollock example will be kept and Heath Stone will be contacted to see if he can provide a description for the paper. Sablefish will be included as an example and Andrew Edwards has provided a small explanation for the paper. Joanne Morgan and Brian Healey will provide a description of the Greenland Halibut assessment within NAFO.

Section 3.2 – Considerations for defining indicators to be used in interim years

The committee had some minor language edits for clarification. Also the committee wanted the key aspects/requirements of indicators to be highlighted. Four of these were discussed. The first was availability of data, the data required to assess the indicators should be available in the interim years and in a timely manner. The second was Relevance, the indicator should be relevant to the health of the stock. The third was Anticipated outcome, ideally some expected value of the indicator would exist so triggers could be based on these expectations. The forth was Signal to noise ratio, an important part of any indicator will be the ability to track changes in abundance.

Section 3.3 – Roles and responsibility for triggering a new assessment

The committee recommended this section of the document was too specific in its definition of roles and responsibilities for the different sectors, Science and EFM. Therefore, this section was heavily edited by the committee to remove the previous language on the broad responsibilities of each sector. The focus now is strictly on what each sector does during the interim years in reference to interim year updates and advice.

Section 3.4 – Guidance on setting triggers that would prompt an assessment earlier than the pre-agreed assessment cycle

A large amount of time was spent working through the guidance in this section on setting triggers. The committee tried to develop advice that would be useful and explicit but not too constricting as triggers could be set for any specific fishery. The committee recommended adding the following passage to the introduction to the section "Ideally triggers would be set so (1) false positives and false negatives are minimized, and (2) the triggers are sensitive enough to changes that are of concern". Also there was consensus that when selecting a trigger the precision of the predicted value and the range should be considered. Ideally before a trigger is formally accepted at a full stock assessment process a retrospective analysis could be done to see when and how often a trigger would have been crossed in previous years. This would ensure that values are not chosen that would result in annual triggering of a new stock assessment and ensure that triggers would be activated when important changes in the stock had been observed.

In the research document there was subsections for different analytical techniques for assessments, an extended amount of time and discussion was spent on these sub-sections. Specifically, the committee focused much attention on Survey Index as an indicator and how triggers should be set in these scenarios. The consensus was that it may be advisable for survey indices to be smoothed, to decrease the influence of year effects triggering a new assessment. The committee also wanted the inclusion of a good example of a species assessment where the survey index is currently smoothed and the number of years it is smoothed over.

In the sub-section on "stocks assessed using an abundance/biomass index trend" some small edits were made to wording to clarify meaning and improve readability. It was again suggested that smoothing of the indices would be advisable to decrease the likelihood of year effects triggering a new assessment. The length of the smoothing period and specific value of the trigger would be stock dependent. The smoothing period would depend on a number of factors including mean generation time and variability in the index. It was agreed the sub-section would be bolstered with a larger discussion of smoothing.

In the sub-section on "Stocks assessed using a catch index" it was re-iterated that the deviance from expected catch that would trigger a new assessment must be established by experts at the full stock assessment process. Also there may need to be more than one year of deviation from expected catch as EFM may be able to adjust the ensuing year's quota to compensate for one year.

The committee developed language to replace the sub-section on "stocks where only information other than an abundance is available in interim years and alternate indices are used". This language will replace the entire section with a new title "stocks where productivity or abundance is assessed using proxy indicators".

Section 3.5 – Adjusting harvest advice and/or fish plans according to the change in status indicators

The committee wanted it highlighted that an agreement should be reached at the assessment or advisory meeting on a procedure for adjusting harvest advice according to the change in status indicator. Other than this change the committee's other suggestions on this section were minor editorial changes.

Section 3.6 – Considerations for determining the frequency of interim year updates

There were only some minor edits recommended by the committee to clarify the text.

Section 4 – Communication of advice including interim year updates

Overall the discussion on this section was brief. The committee felt the section was clear and concise and the addition of example language to use for expressing if a re-assessment is warranted would be very beneficial to the document. In the working paper there were several bullets at the end of the section and it was suggested that these bullets (pertaining to considerations discussed in 3.2 – 3.4) be moved to other sections.

Section 5 – TOR development checklist (for assessments and for interim year updates)

The discussion on this section was relatively brief and straight forward. The committee felt that the important topics that needed to be in this section were highlighting that the TOR must clearly express that indicators, triggers and a schedule of interim year updates needs to be discussed and agreed to at the assessment meeting.

Conclusions and Recommendations

1. Within DFO multi-year assessments are being undertaken for many stocks and there is a need to provide interim year advice. The Research Document and resulting SAR provides guidance on providing advice to clients for the interim years between multi-year full assessments.
2. The interim year advice process should be established early in the Science Advice process. Details of indicators and triggers as well as measures to be undertaken need to be clearly identified during the full stock assessment process.
3. Indicator(s), which are proxies or metrics of stock status, must be defined during the multi-year full stock assessment process, including those required for the application of the harvest control rules.
4. Triggers are pre-defined thresholds of an indicator which if crossed would signal a change in stock status that may warrant an assessment ahead of schedule. They must be defined during the multi-year full stock assessment process.
5. Interim year updates are the science response advisory processes that are carried out between full stock assessments. Interim year updates may be produced annually or at less frequent intervals within the multi-year assessment cycle.
6. Interim year updates are scheduled during the full assessment processes, but they could be requested due to exceptional circumstances.
7. It should not be expected that an interim year update would be conducted by Science every year. One of the main goals of multi-year assessments was to reduce workloads. During the full stock assessment it is important to ensure this goal is met.

8. The development of indicators and triggers as well as the frequency of the interim year updates will be stock specific.
9. It is recognized that in practice that there may be insufficient time to complete a re-assessment in interim years in order to provide revised advice for the pending fishing year, in cases where it is determined that a re-assessment is warranted.

Review and revision of draft Science Advisory Report

A draft Science Advisory Report was circulated to participants at the end of the second day. This draft advisory report was the subject of discussions and revisions by all participants during the third day of the meeting.

SOURCES OF UNCERTAINTIES

The committee was unsure how readily the recommendation would be accepted and implemented once this process was completed. It remains to be seen how the different regions will implement the advice and recommendations stemming from this process into their multi-year full stock assessment processes.

ACKNOWLEDGEMENTS

The Technical Expertise in Stock Assessment (TESA) committee and the meeting chairs would like to thank all the participants for their extensive engagement and thorough participation throughout the three day meeting.

APPENDIX A: AGENDA

National Peer Review Meeting Agenda

"Providing Science Advice to management in the interim years for multi-year stock assessments" TESA workshop

Mar 10-12, 2015
Ottawa, Ontario

Chairs: Joanne Morgan and Brian Lester

March 10, 2015 (All times EST)

Time	Topic
8:30	Introductions and agenda review
8:45	TOR
9:00	Presentation of working paper
10:45	---- BREAK ----
11:00	Questions for clarification
11:15	Identify gaps in sections
12:15	----- LUNCH ------
13:15	Breakout into groups to address gaps
17:00	End of day

March 11, 2015 (All times EST)

Time	Topic
8:30	Day one recap
9:00	Break outs for Section revisions and edits
11:00	------ BREAK -----
11:15	Check-in on progress
12:15	----- LUNCH -----
13:30	Re-presentation of Section 2 & 3 highlighting SAR sections
14:45	----- BREAK -----
15:00	Section 4 review
16:30	TESA Steering Committee Meeting

March 12, 2015 (All times EST)

Time	Topic
8:30	Recap – Where are we at?
9:00	Presentation of the SAR and run through
9:45	Context
10:30	----- BREAK -----
10:45	Recommendations
12:00	----- LUNCH -----
13:00	Advice
14:30	----- BREAK -----
14:45	Revisit SAR as a whole
15:30	Appendices

APPENDIX B: ATTENDEES

Last name	First name	Affiliation
Castonguay	Martin	Science - Quebec region
Chaput	Gerald	Science - CSAS Coordinator Gulf region
Coffin	David	EFM - Newfoundland and Labrador region
Duplisea	Daniel	Science - Quebec region
Duprey	Nicholas	Science - National Capital region
Edwards	Andrew	Science - Pacific region
Gauthier	Johanne	Science - Quebec region
Healey	Brian	Science - Newfoundland and Labrador region
Howland	Kim	Science - Central and Arctic region
Keizer	Adam	EFM - Pacific region
Kristmanson	James	Science - CSAS - National Capital region
Krohn	Martha	Science - National Capital region
Lester	Brian	Co-Chair - EFM - National Capital region
Mallet	Pierre	EFM - Gulf region
Morgan	Joanne	Co-Chair - Science - Newfoundland and Labrador region
Morin	Bernard	EFM - Quebec region
Newbould	Andrew	Science - Maritimes region
Tallman	Ross	Science - Central and Arctic region
Wade	Elmer	Science - Gulf region
Zhu	Xinhua	Science - Central and Arctic region

APPENDIX C: TERMS OF REFERENCE

PROVIDING SCIENCE ADVICE TO MANAGEMENT IN THE INTERIM YEARS FOR MULTI-YEAR STOCK ASSESSMENTS (TECHNICAL EXPERTISE ON STOCK ASSESSMENTS)

National Peer Review - National Capital Region

March 10-12, 2015
Ottawa, ON

Chairpersons: Joanne Morgan and Brian Lester

Context

Fisheries and Oceans Canada (DFO) is implementing the multi-year approach to fisheries stock assessments and management. This is intended to provide stability and predictability for fishers and to reduce the frequency of peer reviewed stock assessment meetings and subsequent fisheries management decision-making processes. The Department's early experience with this broader implementation of multi-year assessments has highlighted the need for clear guidelines on when and what kind of advice is required for the interim years between full stock assessments.

The DFO Technical Expertise in Stock Assessment (TESA) program was created in 2008 to help rebuild capacity in fish stock assessment and to develop analytical approaches. The TESA program will use this National Peer Review to fulfill its mandate to coordinate an annual National Stock Assessment Methods meeting.

Proposed Approach

Two WebEx meetings will be used to advance discussions on the guidance document before a face-to-face meeting in March 2015. Regional experience with multi-year advice will be presented at the first Webex meeting, including how multi-year assessments are currently implemented for key commercial stocks in each region. Detailed case studies will not be presented, but examples of processes that worked well will be provided, as well as examples that highlight key issues.

A second WebEx meeting will focus on further exploring how different Regions and/or fisheries handle interim advice for multi-year fisheries and work towards an outline of topics for the meeting in Ottawa in March. This second WebEx will include a larger group of stock assessment biologists that have been identified as having experience with interim advice for multi-year stock assessments. Guidance will be drafted based on WebEx discussion, and the draft guidance will be presented, reviewed and further developed at the face to face meeting in Ottawa in March.

Objectives

The meeting aims to provide guidance based, in part, on regional experience in undertaking stock assessments. Further, various approaches within and external to DFO will be reviewed and new approaches could potentially be developed. A key objective of the meeting is to produce guidelines or best practices to be used in future stock assessments. This document could become the national standard for stock assessments providing consistency to clients of DFO Science within and outside of the Department.

It will be particularly important to ensure that approaches to interim-year advice are relevant and useable by clients (i.e., fisheries managers) in planning and engaging industry on multi-year harvest plans. The guidance will be focussed on the process required, as opposed to the scientific methodologies applied, and will aim to strike a balance between clear guidance and considerations that could leave some room for flexibility given the range of situations for different stocks and fisheries.

Questions to help orient discussion towards useful products include but are not limited to:

- Does science recommend providing an update in the interim years? Given the goal of the multi-year assessments is to reduce workload, are there conditions that result in no provision of advice?
- What approaches exist to provide advice that allows managers to adjust the total allowable catch (TAC) in interim years based on changes in an index in the interim years? Updated advice could depend on available data, analytical assessment methods, and whether there is fishery independent and/or catch data available during the interim period.
- What conditions would trigger new advice and how do these triggers differ with type of assessment (analytical vs survey based, species life-history, etc.). i.e. what are recommended interim year indicators and how to determine if the stock is sufficiently outside the bounds of expectation to warrant changes to the interim year management plan?
    - To what extent and how should the interim plan be laid out at the full assessment meeting?
    - Whether and how to set triggers for interim new advice or a new assessment, and would there be set times for interim "checks" to make sure triggers haven't been reached?
- How should the interim advice be reported (e.g. a Science Response).

Expected Publications

- Proceedings
- Research Document
- Science Advisory Report

Participation

- DFO – Ecosystems and Oceans Science sector
- DFO – Ecosystems and Fisheries Management sectors